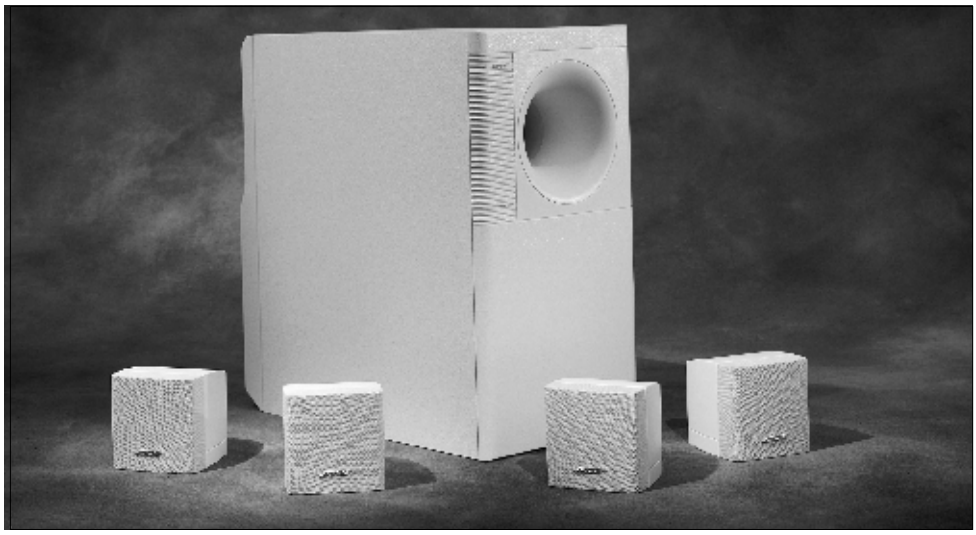


FreeSpace® 3 Loudspeaker System Application Note

for Sales Engineers

The FreeSpace® 3 loudspeaker system is a top-of-the-line business music system from Bose®. This surface-mounted Virtually Invisible® 200-watt, speaker system delivers full, lifelike sound with deep rich bass in background and foreground applications.
It is modular and easy to expand.

Key Features

System Configurations

•70V/100V (25W, 50W, 100W, 200W taps) monaural

•Transformer bypass 3.5 Ohm mono or 6 Ohm per channel stereo operation

Acoustic Performance

- Lifelike, spacious sound over large coverage area
- Frequency Range:

  50Hz to 16kHz (±3dB)
- Maximum sound pressure in typical rooms using recommended designs:

Typical dB-SPL	Tap
89 - 92	200 W
86 - 89	100 W
83 - 86	50 W
80 - 83	25 W

Ease of Use

- No eq card or special controller required
- Wall mount brackets allow easy installation and aiming
- Built-in transformer allows multiple tap settings and easy adjustment
- Transformer bypass for direct coupled operation
- Each bass module accepts connection of 2 or 4 satellites
- Connector panel cover improves appearance and tamper resistance

Elegance

- Acoustimass® speaker technology allows the bass module to be located out of sight
- Virtually Invisible® satellites that are unobtrusive and stylish
- Available in black or white, or may be painted with latex or oil-based paint

Mechanical Specifications

Satellites

Dimensions: 3.1"H x 3.1"W x 3.2"D (7.9 cmH x 7.9 cmW x 8.1 cmD)

Weight: 1.75 lb (0.8 kg)

Bass Module (w/Bracket)

Dimensions: 14.0"H x 8.7"W x 13.6"D (35.6 cmH x 22.1 cmW x 34.5 cmD)

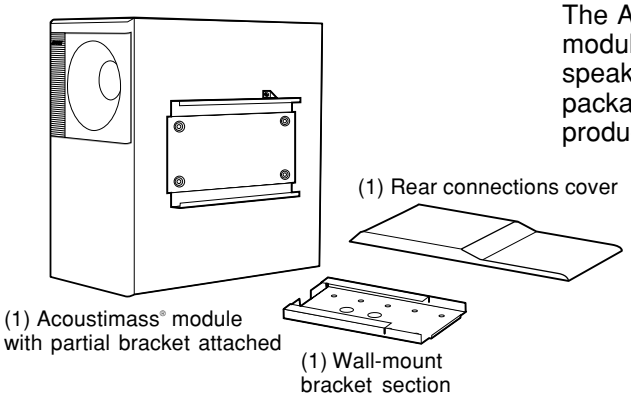
Weight: 17.5 lb (7.9 kg)

Applications

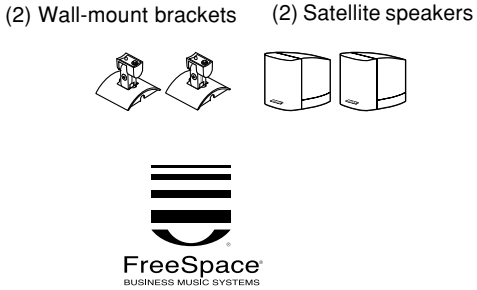
Appropriate applications include:

- Retail spaces
- Restaurants/Bars/Pubs
- A/V presentations in conference and media rooms
- Salons
- Reception areas
- Offices

Included in Two Cartons



The Acoustimass® module and satellite speaker pair are packaged as separate product codes.



FreeSpace® 3 System Design Guidelines

Satellite Placement

Satellite Guidlines

- A single Satellite covers a circular area with a diameter of approximately 25 feet.
- Keep a satellite within 25 feet of any listener.
- Mount satellites between 10' and 14' high
- Use a pitch of 10°.

Design Rules

1 Satellites work best when located in corners

2 When designing systems, start by adding satellites in the corners. (Two satellites in adjacent corners can cover a wall length up to 50 feet.

3 For smaller rooms (under 45' in both dimensions, but greater than 25' and a ceiling higher than 10') use four satellites with one Acoustimass bass module

4 In all other systems use one bass module for every two satellites

5 For wall lengths greater than 60', add another satellite for every 25 feet.

6 For wall lengths less than 30 feet, use two satellites and alternate satellites on the two longer walls

7 Use even number of satellites.

Bass Module Placement

- For best performance, place the module more than 10 feet from the listeners, but never more than 35-40 feet away.
- If the module will be less than 10 feet from the listeners, mount it next to a satellite.

When Surface Mounting

- For maximum efficiency, try to boundary-load the bass module against large hard surfaces.
- Ideal location is in a corner. Second best location is against hard walls.
- For best coverage, avoid centering the module along any wall to avoid acoustic interference.

When Flush Ceiling-Mounting

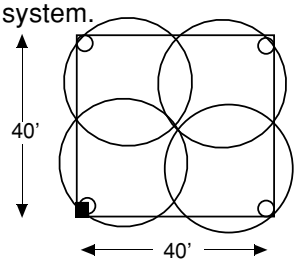
- For best coverage, avoid centering modules in the room.
- Mount them 4-5 feet off the center line.
- Avoid the geometric center of the ceiling.

Design Examples

Room Size (feet x feet)	Typical System satellites & bass
40 x 40 (x12'*h*)	4 & 1
45 x 45 (x9'*h*)	4 & 2
40 x 60 (x12'*h*)	4 & 2
40 x 80 (x13'*h*)	6 & 3
40 x 100 (x14'*h*)	8 & 4
60 x 60 (x14'*h*)	4 & 2
60 x 80 (x10'*h*)	6 & 3
60 x 100 (x12'*h*)	8 & 4

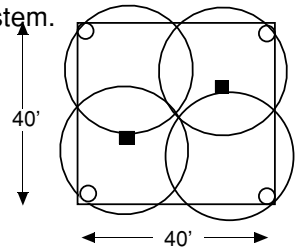
Example 1A:
Using Surface-Mounted Bass Modules to Create a Background System for a 40'x40'x11' Room

This room can be designed using four satellites (small circles below) mounted at 9 feet in the corners and pitched at 10°. A single module (black square) is placed in one of the four corners. Tapped at 25W, the system will deliver 80-83 dB SPL. Amplifier power of 32W (=1.25*25W) is recommended for this system.



Example 1B:
Using Flush Ceiling-Mounted Bass Modules in a Background System for a 40'x40'x9.5' Room

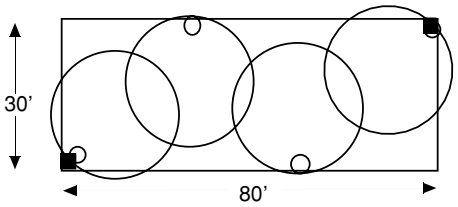
Like Example 1A, this room requires four satellites. With a ceiling height of less than 10 feet, however, it needs two flush ceiling-mounted modules (one per two satellites). They should be mounted asymmetrically, at least 4 feet off the room center line and at least 20 feet apart. Tapped at 25W, the system delivers 80-83 dB SPL. Amplifier power of 60W is recommended for this system.



Example 2A:
Using Surface-Mounted Bass Modules in a Foreground System for an 80'x30'x14' Room

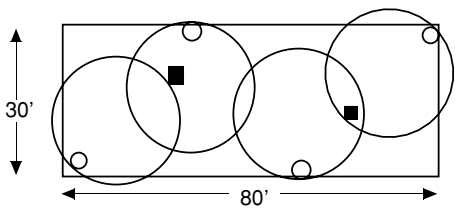
This design features four satellites mounted as shown in the figure above, right. Placed at 13.5 feet, the satellites are mounted at a 10° pitch.

Two surface-mount modules are installed, jointly with the corner satellites, in two opposite corners. Tapped at 100W, the system will deliver 86-89 dB SPL. Amplifier power of 400W is recommended for this system.



Example 2B:
Using Flush Ceiling-Mounted Bass Modules in a Room Similar to 2A

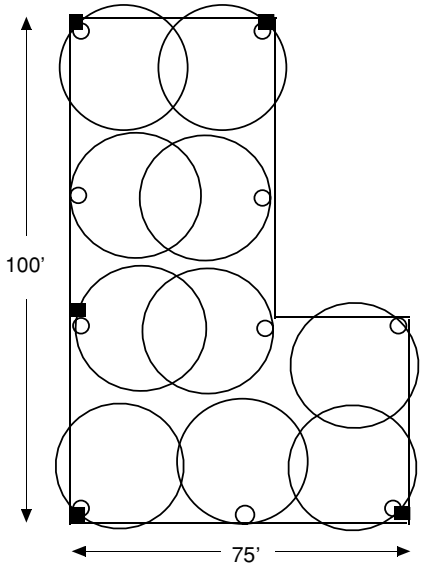
This design uses the same number and location of satellites as Example 2A. Two flush ceiling-mounted modules are evenly spaced between walls, but offset from the center line. Tapped at 100W, the system and will deliver 86-89 dB SPL.



Examples...

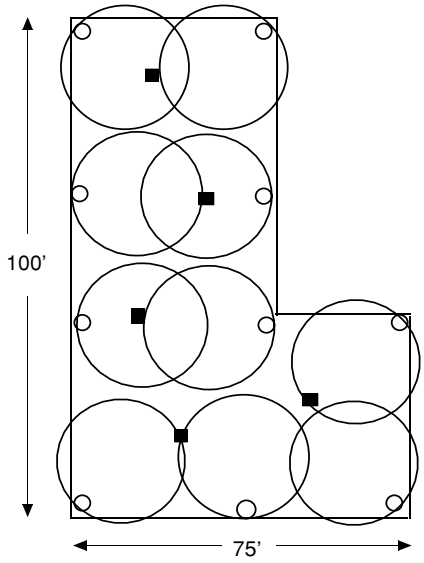
Example 3A: Using Surface-Mounted Bass Modules for a Foreground System in an L-shaped 100'x75'x13' Room

One design option is exercised using ten (10) satellites mounted as shown in the figure to the right, at a height of 12.5 feet and a pitched of 10°. This design requires using five modules. Tapped at 200 W, this system delivers 89-92 dB-SPL. Amplifier power of 2000W is recommended for this system.

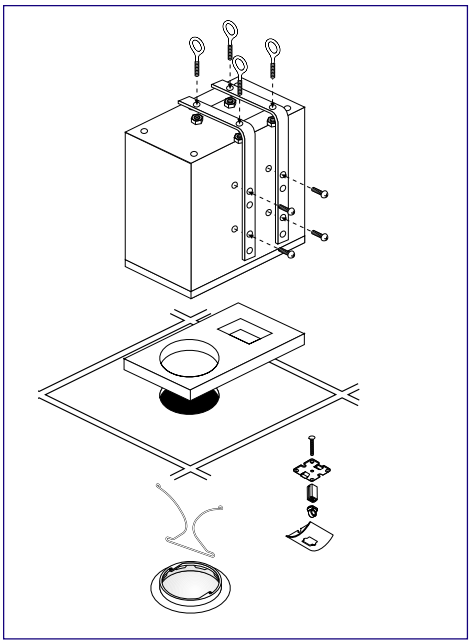


Example 3B: Using Flush Ceiling-Mounted Bass Modules in a Room Like Example 3A

A second option uses the same number and location of satellites as in 3A and the same number of bass modules. But here the modules are flush ceiling-mounted at least 3-4 feet off the center line.



Accessories



The FreeSpace® 3 speaker ceiling adapter kit allows for suspending the module above the ceiling, using an exit grille like the one used with the Model 8.

Black and white satellite extensions are also included (shown at the lower right of the figure) in the kit, to allow for ceiling mounting the satellites, too.

This product is available under product code 026623.

Amplifiers

A single FreeSpace 3 system tapped at 200W requires an amplifier that can deliver 200W continuous with (3dB) peaks.

To ensure proper amplification for a system designed with FreeSpace 3 speakers:

1. Add the wattage taps of the speakers to calculate the total number of watts drawn from the line.
2. The continuous output power rating greater than the wattage drawn and capable of handling peaks of twice the wattage drawn. Allowing at least 25% of continuous power headroom is recommended.

Example

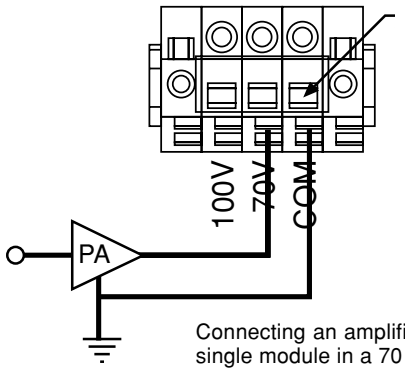
A FreeSpace 3 system tapped at 100W requires an amplifier with at least 100W of continuous output power.

Allow for 25% headroom in background music systems. A 125W amplifier is recommended.

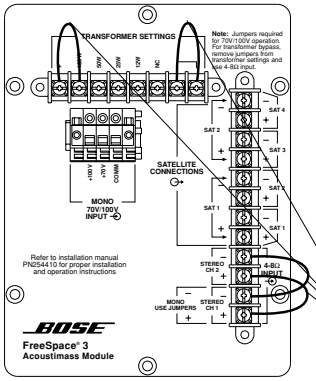
For foreground music systems - 100% headroom is recommended. A 200W amplifier should be used.

FreeSpace® 3 System Wiring Options

Use of Transformer



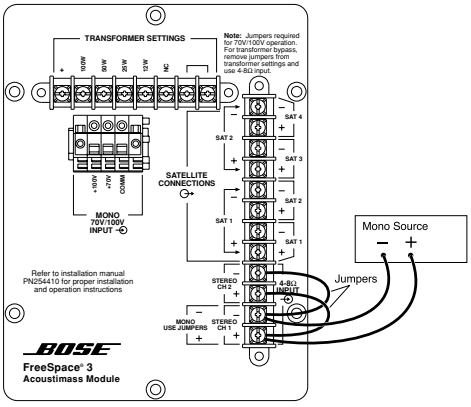
Connecting an amplifier output to a single module in a 70 V configuration


TRANSFORMER SETTINGS
Note: Jumpers required for 70V/100V operation. For transformer bypass, remove jumpers from transformer settings and use 4-8Ω input.
SATELLITE CONNECTIONS
MONO 70V/100V INPUT
4-8Ω INPUT
FreeSpace® 3 Acoustimass Module

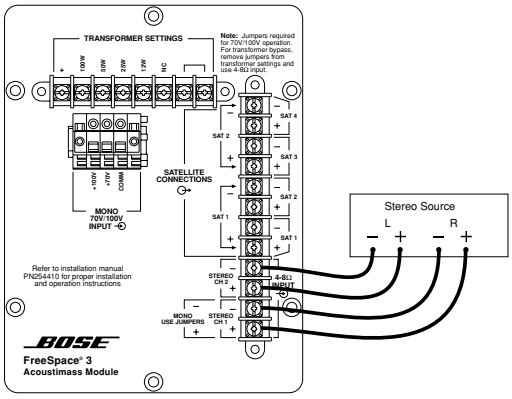
The transformer tap setting from the factory is for 200W use. To set it for lower wattage, remove the end of the '+' jumper wire connected to 200W and reattach it to the appropriate tap (100W, 50W or 25W).

Connection jumpers as factory installed

Use of Direct Mode (Transformer Bypass)

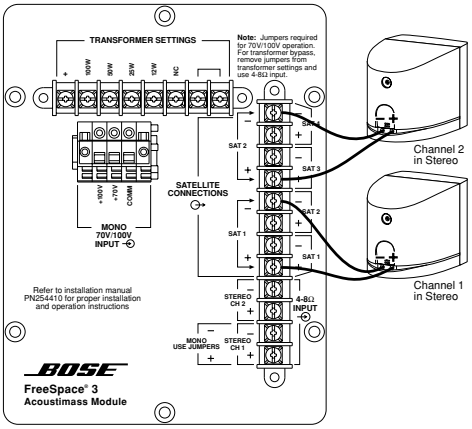

TRANSFORMER SETTINGS
Note: Jumpers required for 70V/100V operation. For transformer bypass, remove jumpers from transformer settings and use 4-8Ω input.
SATELLITE CONNECTIONS
MONO 70V/100V INPUT
4-8Ω INPUT
Mono Source
Jumpers
FreeSpace® 3 Acoustimass Module

Connecting mono source with the transformer bypassed

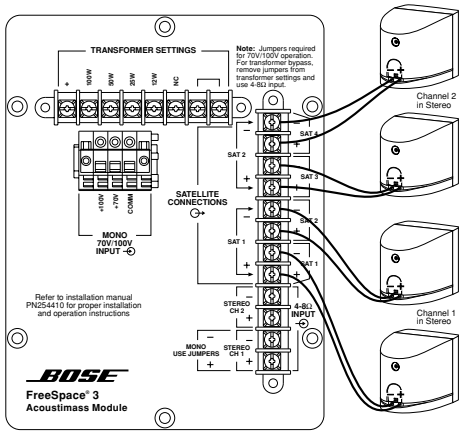


Connecting a stereo source with the transformer bypassed

Wiring Satellites to the Module (with or without Transformer)


TRANSFORMER SETTINGS
Note: Jumpers required for 70V/100V operation. For transformer bypass, remove jumpers from transformer settings and use 4-8Ω input.
SATELLITE CONNECTIONS
MONO 70V/100V INPUT
4-8Ω INPUT
Channel 2 in Stereo
Channel 1 in Stereo
FreeSpace® 3 Acoustimass Module

Using 2 satellite speakers


TRANSFORMER SETTINGS
Note: Jumpers required for 70V/100V operation. For transformer bypass, remove jumpers from transformer settings and use 4-8Ω input.
SATELLITE CONNECTIONS
MONO 70V/100V INPUT
4-8Ω INPUT
Channel 2 in Stereo
Channel 1 in Stereo
FreeSpace® 3 Acoustimass Module

Using 4 satellite speakers with direct connections